

**BROOKHAVEN NATIONAL LABORATORY
NATIONAL SYNCHROTRON LIGHT SOURCE**

MEMORANDUM

DATE: 11 September 2000

TO: Sam Krinsky, Richard Osgood, Peter Paul

CC: NSLS Management Group, FEL Project Team

FROM: William S. Graves, Richard Heese, Erik D. Johnson

SUBJECT: DUV-FEL Project Report; Period ended 8 September 2000

Work in Progress:

During last week the focus was on the photo-injector. The new cathode conditioned very rapidly (2 days) to full power. As previously noted, the performance of the system is much different than before. The electron beam no longer clips on the normal incidence mirrors, and the energy appears to be higher than before. Much of the week was devoted to careful measurements of the RF power delivered to the gun. The maximum available power was measured at 7.8 MW. Also, at Li-Hua's suggestion, an ATF short trim was borrowed from the HGHG experiment and installed just after the solenoid to be used as a small energy spectrometer. Preliminary estimates are that the beam energy out of the gun is 4.6 MeV which is still lower than expected for the delivered RF power. There is still some uncertainty in this measurement to be addressed (see below). The trim needs to be returned to the ATF for the HGHG experiment, but a replacement will be permanently installed on the DUV-FEL photo-injector so we will always have this handy diagnostic available.

Work Planned for Next Week(s):

There are several activities planned for the week. To reduce the uncertainty in the energy measurement at the gun, the trim is being removed and will be measured. The plan is to set it up next to a 'spare' solenoid end plate to simulate the arrangement in the DUV-FEL photoinjector. The measured field values will then be used for determining the actual beam energy out of the photo-injector. In parallel, we will make emittance measurements of the full energy beam in the early part of the week. The last half of the week is to be devoted to laser development. There is still structure in the beam that reaches the photocathode that we hope to clean up. This accelerator down time will be used to install detector components in the enclosure for the COUR experiment. Other 'punch-list' activities will continue as time allows.

Management:

No new issues.